

# DICTIONARY OF MICROBIOLOGY and MOLECULAR BIOLOGY

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## **fusarium wilt**

**fusarium wilt** A VASCULAR WILT caused by a *Fusarium* sp. — usually *F. oxysporum* ('oxysporum wilt'). Strains of *F. oxysporum* may have a narrow, intermediate or wide host range: e.g. *F. oxysporum* f. sp. *cubense* infects banana plants ('Panama disease'); f. sp. *lini* infects flax; f. sp. *lycopersici* infects tomatoes (cf. LYCOMARASMIN); f. sp. *conglutinans* infects cruciferous plants; f. sp. *vasinfectum* infects e.g. coffee, cotton, cowpea, rubber (*Hevea*), soybean, and many other plants. Typical symptoms of fusarium wilts include brown or black vascular discoloration and wilting, sometimes preceded by e.g. epinasty, vein-clearing and leaf chlorosis; affected plants generally die.

**fusarubin** See NAPHTHAZARINS.

**Fuscidea** See LECIDEA.

**fusel oil** A mixture of higher alcohols (mainly amyl, isoamyl, isobutyl, and propyl alcohols) formed in small quantities as by-products of ALCOHOLIC FERMENTATION; the alcohols are formed by deamination, decarboxylation and reduction of amino acids, and from keto acid precursors of amino acids.

**fusicoccin** A toxin, produced by *Fusicoccum amygdali*, which can affect a range of plants. Fusicoccin can increase the rate at which a plant loses water, e.g. by promoting the opening of stomata. It can also stimulate H<sup>+</sup> efflux across the plasmalemma, thus facilitating uptake of e.g. K<sup>+</sup> and certain energy-yielding substrates; this may at least partly account for the observed growth-promoting activity of fusicoccin.

**Fusicoccum** A genus of fungi of the COELOMYCETES.

**fusidic acid** An ANTIBIOTIC produced e.g. by *Cylindrocarpum* sp. (= *Fusidium coccineum*) and *Acremonium* (*Cephalosporium*) spp; it is a steroid structurally related to cephalosporin P1 — with which it exhibits cross-resistance. Sodium fusidate (fucidin) is active (bacteriostatic) against Gram-positive bacteria — particularly staphylococci; it inhibits PROTEIN SYNTHESIS by binding to EF-G, preventing the dissociation of EF-G and GDP from the ribosome following translocation. The EF-Gs (= EF-2s) from certain archaeobacterial species (e.g. methanogens, halobacteria) are sensitive to fusidic acid, whereas those from e.g. *Desulfurococcus mobilis*, *Sulfolobus solfataricus*, *Thermococcus celer* and *Thermoplasma acidophilum* are insensitive [JB (1986) 167 265–271].

**Fusidium** See CYLINDROCARPON.

**fusiform** Spindle-shaped; tapered at both ends.

**Fusiformis** An obsolete bacteria genus. (See BACTEROIDES and FUSOBACTERIUM.)

**fusigen** A SIDEROPHORE produced by e.g. *Aspergillus* spp.

**fusion protein** (1) In e.g. viruses of the genus PARAMYXOVIRUS (e.g. Sendai virus): a protein which promotes fusion between host cells, as well as between the virus envelope and host plasma membrane.

(2) A protein containing amino acid sequences from each of two distinct proteins; it is formed by the expression of a recombinant gene in which two coding sequences have been joined together such that their reading frames are in phase. Hybrid genes of this type may be constructed in vitro e.g. in order to label the product of a particular gene with a protein which can be more readily assayed: e.g., if a gene is fused with *lacZ* in *Escherichia coli*, a fusion protein with  $\beta$ -galactosidase activity may be obtained. Alternatively, a protein may be linked to a signal peptide (see SIGNAL HYPOTHESIS) to allow its secretion by the cell. The products of certain viral ONCOGENES are fusion proteins (see e.g. MYC).

**Fusobacterium** A genus of Gram-negative bacteria (family BACTEROIDACEAE) which occur e.g. in the human mouth and intestine, and in the RUMEN, and which include human and animal pathogens (see NECROBACILLOSIS and FOOT-ROT; see also SWINE DYSENTERY). Cells: typically fusiform or non-fusiform rods or filaments; all species are non-motile. Fermentation of peptone or carbohydrates yields butyric acid as a major product; isobutyric and isovaleric acids are not formed, but small amounts of acetic, formic, lactic or propionic acids may be formed. Optimum growth temperature: ca. 37°C. GC%: ca. 26–34. Type species: *F. nucleatum*.

*F. necrophorum* (formerly *Fusiformis necrophorus*, *Sphaerophorus necrophorus*). Fusiform or round-ended cells. Propionate is formed from both threonine and lactate; aesculin is not hydrolysed; indole +ve; copious gas is usually formed from glucose.

*F. nucleatum* (formerly *Fusiformis fusiformis*, *Fusobacterium polymorphum*, *Sphaerophorus fusiformis*). Cells: typically fusiform rods or filaments. Propionate is formed from threonine but not from lactate; aesculin is not hydrolysed; indole +ve; typically, little gas is formed from glucose.

Other species: *F. gonidiaformans*, *F. mortiferum*, *F. naviforme*, *F. necrogenes*, *F. perforans*, *F. prausnitzii*, *F. russii* and *F. varium*.

**Fusulina** See FORAMINIFERIDA.

**fusulinids** See FORAMINIFERIDA.

**Fusulinina** See FORAMINIFERIDA.

**futile cycle** The cyclic interconversion of two compounds by irreversible reactions catalysed by two or more enzymes which are active at the same time within the cell, the result being